Claims

1. A method for calibrating a current control circuit, comprising the steps of:

setting a conduction time of a low-side switch to provide a desired load current to a load, wherein the low-side switch is coupled between a low-side of the load and ground;

determining a high-side load current on a high-side of the load when a low-side load current on a low-side of the load transitions through a first predetermined reference level, wherein the high-side of the load is coupled to a power source;

establishing a first correction factor based upon the high-side load current and the low-side load current; and

adjusting the conduction time of the low-side switch based on the first correction factor to provide the desired load current to the load.

2. The method of claim 1, wherein the high-side load current is determined by measuring a voltage drop across a sense resistor positioned in a first leg of a current mirror, and wherein a second leg of the current mirror includes a high-side resistor coupled in series between the power source and the load.

3. The method of claim 1, wherein the step of establishing a first correction factor based upon the high-side load current and the low-side load current includes the step of:

periodically modifying the first correction factor based on a value of the high-side load current when the low-side load current transitions through the first predetermined reference level.

4. The method of claim 1, further comprising the steps of:

determining the high-side load current when the low-side load current on the low-side of the load transitions through a second predetermined reference level;

establishing a second correction factor based upon the high-side load current and the low-side load current when the low-side load current transitions through the second predetermined reference level; and

adjusting the conduction time of the low-side switch based on the first and second correction factors to provide the desired load current to the load.

5. The method of claim 4, wherein the low-side switch is a metal-oxide semiconductor field-effect transistor (MOSFET).

6. The method of claim 4, wherein the step of establishing a second correction factor based upon the high-side load current and the low-side load current includes the step of:

periodically modifying the second correction factor based on a value of the high-side load current when the low-side load current transitions through the second predetermined reference level.

7. An electronic control module, comprising:

a processor;

a first current measurement circuit including an output coupled to a first input of the processor, the first current measurement circuit providing a first signal on the output that is indicative of whether a level of a high-side load current provided to a load is at a desired load current level, and wherein the high-side of the load is coupled to a power source;

a low-side switch including a control terminal and a pair of output terminals, wherein one of the output terminals is coupled to a low-side of the load and the other output terminal is coupled to common, and wherein the control terminal of the low-side switch is coupled to a first output of the

processor which provides a pulse width modulated signal to cause the low-side switch to conduct and achieve the desired load current;

a second current measurement circuit providing a second signal to a second input of the processor when a low-side load current transitions through a first predetermined reference level; and

a memory subsystem coupled to the processor, the memory subsystem storing code that when executed by the processor instructs the processor to perform the steps of:

setting a conduction time of the low-side switch to provide the desired load current to the load;

determining the high-side load current when the low-side load current transitions through the first predetermined reference level; and

establishing a first correction factor based upon values of the high-side load current and the low-side load current when the low-side load current transitions through the first predetermined reference level; and adjusting the conduction time of the low-side switch based on the first correction factor to provide the desired load current to the load.

8. The module of claim 7, further comprising:

a comparator circuit including a first input, a second input and an output, wherein the first input of the comparator circuit is coupled to the output of the first current measurement circuit, the second input of the comparator circuit is selectively coupled to one of a plurality of PWM outputs of the processor and the output of the comparator circuit is coupled to a third input of the processor, and wherein each of the plurality of PWM outputs of the processor provide a different threshold level and the memory subsystem stores additional code for instructing the processor to perform the additional steps of:

monitoring the output of the comparator circuit at the third input of the processor; and

modifying the adjusted conduction time of the low-side switch to provide the desired load current to the load.

9. The module of claim 7, wherein the first current measurement circuit includes a sense resistor positioned in a first leg of a current mirror and the high-side load current is determined by measuring a voltage drop across the sense resistor, and wherein a second leg of the current mirror includes a high-side resistor coupled in series between the power source and the load.

10. The module of claim 7, wherein the step of establishing a first correction factor based upon the high-side load current and the low-side load current includes the step of:

periodically modifying the first correction factor based on a value of the high-side load current when the low-side load current transitions through the first predetermined reference level.

11. The module of claim 7, further comprising the steps of:

determining the high-side load current when the low-side load current on the low-side of the load transitions through a second predetermined reference level;

establishing a second correction factor based upon the high-side load current and the low-side load current when the low-side load current transitions through the second predetermined reference level; and

adjusting the conduction time of the low-side switch based on the first and second correction factors to provide the desired load current to the load.

12. The module of claim 11, wherein the low-side switch is a metal-oxide semiconductor field-effect transistor (MOSFET).

13. The module of claim 11, wherein the step of establishing a second correction factor based upon the high-side load current and the low-side load current includes the step of:

periodically modifying the second correction factor based on a value of the high-side load current when the low-side load current transitions through the second predetermined reference level.

14. A method for calibrating a current control circuit, comprising the steps of:

setting a conduction time of a low-side switch to provide a desired load current to a load, wherein the low-side switch is coupled between a low-side of the load and ground;

determining a high-side load current on a high-side of the load when a low-side load current on a low-side of the load transitions through a first predetermined reference level, wherein the high-side of the load is coupled to a power source;

establishing a first correction factor based upon the high-side load current and the low-side load current;

adjusting the conduction time of the low-side switch based on the first correction factor to provide the desired load current to the load;

determining the high-side load current when the low-side load current on the low-side of the load transitions through a second predetermined reference level;

establishing a second correction factor based upon the high-side load current and the low-side load current when the low-side load current transitions through the second predetermined reference level; and

adjusting the conduction time of the low-side switch based on the first and second correction factors to provide the desired load current to the load.

15. The method of claim 14, wherein the high-side load current is determined by measuring a voltage drop across a sense resistor positioned in a first leg of a current mirror, and wherein a second leg of the current mirror includes a high-side resistor coupled in series between the power source and the load.

16. The method of claim 14, wherein the step of establishing a first correction factor based upon the high-side load current and the low-side load current includes the step of:

periodically modifying the first correction factor based on a value of the high-side load current when the low-side load current transitions through the first predetermined reference level.

17. The method of claim 14, wherein the low-side switch is a metal-oxide semiconductor field-effect transistor (MOSFET).

18. The method of claim 14, wherein the step of establishing a second correction factor based upon the high-side load current and the low-side load current includes the step of:

periodically modifying the second correction factor based on a value of the high-side load current when the low-side load current transitions through the second predetermined reference level.